

Coloration and biometrics of fledgling Audubon's Shearwaters *Puffinus lherminieri* from Réunion Island, Indian Ocean

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In a recent paper, Shirihai *et al.* (1995) described a new species of shearwater, *Puffinus atrodorsalis*. Here we would like to highlight that Audubon's Shearwaters from Réunion Island (taxon *bailloni*), Indian Ocean, show characters that were apparently unknown to the authors. Fledglings of *bailloni* may in particular appear very similar to *P. atrodorsalis*.

The Audubon's Shearwater breeding population of Réunion Island is currently classified as *Puffinus lherminieri bailloni* (e.g. Jouanin & Mougin 1979, Warham 1990). Actually, adults of *bailloni* show diagnostic characters of the *lherminieri* group, such as pink legs, brown upperparts, lack of white remiges below and biometrics (especially for bill and wing dimensions; see Shirihai *et al.* 1995 for values), but they also share characters with *assimilis*, such as white undertail feathers (except for the two central feathers that are apparently invariably brown at the tip: Jouanin 1970; pers. obs.). Despite this last character, *bailloni* is treated as a *lherminieri* in all recent systematics (see Shirihai *et al.* 1995 for references). We concur with this treatment on the basis of a supplementary trait, that curiously has never been used up to now, namely vocalizations. Despite the existence of geographic variation (as in many other petrels: see for a review Bretagnolle in press), calls of *bailloni* are similar to calls of *lherminieri* from Marquesas, Tahiti, Gambier, Comoros, West Indies and Galapagos, while they are consistently distinct compared to calls of *assimilis* from northern New Zealand, Madeira and Rapa (Bretagnolle unpubl. data).

Between 1987 and 1996, we have conducted intensive fieldwork on the four petrels that breed on Réunion (Bretagnolle & Attié 1991, Attié *et al.* submitted), and were able to catch fledglings of *bailloni* as well as adults. Moreover, we measured all specimens of the *lherminieri/assimilis* complex in Paris, Réunion, Tring and Wellington Museums ($n=128$ *lherminieri*, 120 *assimilis*) over the last two years. A total of 47 *bailloni* were thus available for investigating the potential effects of age, sex and type of material on the biometrics of this taxon. This has led us to recognize important (although yet unreported in the literature) differences in plumage and biometrics according to age in *bailloni* (Table 1), some of which may prove to be unique to that taxon, others not. Three characters, in particular, show a major change between fledgling and adult stages: (1) back colour, which turns from black or dark brown to brown; (2) leg colour, which turns from blue, bluish-grey or a mixture of blue and pink in fledglings, to pink in most adults (an adult female collected at sea had blue legs, however; C. Jouanin, pers. comm.); and (3) bill depth (measured at hook), which

TABLE 1

Comparative biometrics of Audubon's Shearwaters from Réunion Island, according to type of specimen, age and sex. Mean, standard deviation and sample size are given. Data were statistically treated with Analysis of Variance. A one-way ANOVA was conducted on the factor sex. Then a two-way ANOVA considered age and type of material as factors: no significant interaction was found (except for bill depth, $P=0.02$). We thus present data treated with one-way ANOVA for each of the latter factors. *Atrodorsalis* biometrics are shown for comparison

Variable	<i>bailloni</i>			<i>bailloni</i>			<i>bailloni</i>			<i>atrodorsalis</i>	
	Alive (15)	Skins (32)	test	adults (11)	Fledglings (19)	test	Male (13)	Female (9)	test	test	skin ¹ (1)
Wing	199.3 ± 5.43	198.4 ± 7.88	NS	202.1 ± 5.13	196.5 ± 6.74	0.02	201.0 ± 4.36	200.6 ± 6.02	NS	NS	204.5
Tail	76.3 ± 2.95	76.8 ± 3.11	NS	77.8 ± 3.54	75.0 ± 1.94	0.02	77.3 ± 3.48	77.3 ± 3.02	NS	NS	78
Tarsus	41.1 ± 1.23	41.2 ± 1.56	NS	41.0 ± 1.42	41.7 ± 1.65	NS	40.7 ± 1.12	41.3 ± 1.67	NS	NS	40
Culmen	29.1 ± 0.86	28.8 ± 1.01	NS	29.0 ± 1.17	29.0 ± 0.94	NS	29.1 ± 0.91	28.4 ± 0.83	NS ³	NS ³	28
Bill depth	6.7 ± 0.41	6.8 ± 0.51	NS	7.1 ± 0.45	6.5 ± 0.38	0.001	7.0 ± 0.47	6.7 ± 0.45	NS ³	NS ³	—
Bill width	10.8 ± 0.76	11.0 ± 0.58	NS	10.9 ± 0.66	11.0 ± 0.60	NS	11.2 ± 0.59	10.8 ± 0.41	NS ³	NS ³	—
Body weight ⁴	217.8 ± 14.16	216.7 ± 17.7	NS	219.2 ± 12.77	213.1 ± 16.33	NS	225.8 ± 17.05	212.0	NS	NS	—

¹From Shirihai *et al.* (1995).

²Same specimen measured by VB.

³A Multiple Analysis of Variance (MANOVA) performed on the three bill characters gives a significant result ($P=0.05$).

⁴Only 19 birds have been weighed, most of them unsexed.

increases by 10.5% with age (see Table 1). Wing and tail lengths also increase, but to a lesser extent (Table 1 for means and statistics). The first two characters may be unique to *bailloni*, although *P. l. polynesiae* (from the Gambier Is: Bretagnolle pers. obs.) and the Yelkouan Shearwater *P. yelkouan* (Yésou *et al.* 1990, R. Zotier pers. comm., and pers. obs.) show a similar pattern. But the increase in bill depth occurs in all *therminieri*, and *assimilis* for which fledgling skins could be examined (although in slightly smaller proportions), as well as in other petrels (e.g. Genevois & Bretagnolle 1995, and references therein). Other changes also occur in *bailloni*, in bill colour (blue and black in fledglings versus pure black in adults) and the shape of blue and black patches on the upper half of the tarsus (tarsus in fledgling *bailloni* as that described for *atrodorsalis* in Shirihai *et al.* 1995). It is noticeable that the five characters listed above are the most important characters that have been cited as separating *atrodorsalis* from other shearwaters, including *bailloni*.

Fledgling of *bailloni* on Réunion occurs mainly, if not only, between December and April (Jouanin 1970, 1987, Jadin & Billet 1986, Attié & Bretagnolle unpubl. data), although there are two skins in Paris Museum, labelled as fledglings (but without any trace of down), that were collected in August. If moult of fledglings occurs before (or around) the following breeding period (which starts on Réunion in late August), fledgling *bailloni* will thus remain in their juvenile-like plumage (i.e. black and white, with blue legs) from December until August or September, which suggests that separation at sea between *atrodorsalis* and fledgling *bailloni* may be extremely difficult. Incidentally, the period during which fledgling *bailloni* are in their juvenile-like plumage exactly matches the dates that were reported by Shirihai *et al.* (1995) for *atrodorsalis*, although the seasonal pattern may also reflect their lack of data between August and December.

This new information with regard to coloration, biometrics and breeding phenology of *bailloni* from Réunion Island may therefore raise doubts about the identity of the two birds described in Shirihai *et al.* (1995) under the new species, *atrodorsalis*: the holotype (the "Durban bird"), and the BMNH specimen (No. 1866.7.21.10), labelled as juvenile from Réunion. Given the similarity between these two birds, Shirihai *et al.* (1995) concluded that the BMNH skin was an overlooked *atrodorsalis*, not a *bailloni*. We would like to offer the alternative, and maybe more parsimonious explanation, that the BMNH specimen is indeed a juvenile of *bailloni* as it is labelled (see also Bourne 1995). The taxonomic status of the Durban specimen will be discussed in more detail in a companion paper (Colston *et al.*, to be submitted).

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IN BRIEF

EXTRALIMITAL RECORD OF THE SPOT-WINGED FALCONET *SPIZIAPTERYX CIRCUMCINCTUS*

Spizapteryx circumcinctus is distributed from Bolivia and Paraguay to the centre of Argentina and has its southern limit in the northern part Rio Negro eastwards to the southern part of the province of Buenos Aires (Short 1975, Remsen & Traylor 1989, Narosky & Di Giacomo 1993). Throughout this range it occurs in arid woodlands, mainly dry forests and savannas (Short 1975, Blake 1977). On 11 January 1991 I observed an individual in an area of scattered trees in the vicinity of "Brazo Rico" (c. 185 m above sea level), in the southern part of the Parque Nacional Los Glaciares, province of Santa Cruz, southern Argentina. The main field characters of the species were clearly observed: body size about that of American Kestrel *Falco sparverius*, pale and predominantly streaked underparts, rounded and white-spotted wings, dark tail barred with white, and conspicuous white rump contrasting with browner upperparts.

The known range of the species has recently been extended to northern Bolivia (Remsen & Traylor 1989) and the eastern Argentine provinces of Corrientes (Contreras 1986) and Entre Ríos (Abadie